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(a) determining an expression for an expected gain of said array, said expression being dependent on said weights assigned to each variable representing an input from a microphone, and

(b) maximizing said expression,

wherein said expression also contains variables representing a variance of magnitude fluctuations from inputs from said microphone and a variance of phase fluctuations from said inputs from said microphone.

33. A method as in claim 32 wherein said expression is

$$E\{G(\omega)\} = \frac{e^{-\sigma_p^2} (W_0^H R_{ss}(\omega) W_0) + (1 - e^{-\sigma_p^2} + \sigma_m^2) (W_0^H \text{diag}(R_{ss}(\omega)) W_0)}{e^{-\sigma_p^2} (W_0^H R_{nn}(\omega) W_0) + (1 - e^{-\sigma_p^2} + \sigma_m^2) (W_0^H \text{diag}(R_{nn}(\omega)) W_0)}$$

where

$E\{G(\omega)\}$ is the expected gain,

σ_m^2 is the variance of the magnitude fluctuations due to microphone tolerance,

σ_p^2 is the variance of the phase fluctuations due to microphone tolerance,

R_{ss} is a signal correlation matrix,

R_{nn} is a noise correlation matrix,

41
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W₀ is a nominal value vector of weights assigned to each microphone in the array.

34. A method as in claim 33 wherein step (b) is accomplished by setting the vector W₀ equal to the eigenvector which corresponds to the maximum eigenvalue of the symmetric matrix

$$A^{-1}B$$

where

$$A = \left(e^{-\sigma_p^2} R_{nn}(\omega) + (1 - e^{-\sigma_p^2}) \text{diag}(R_{nn}(\omega)) \right)$$

and

$$B = \left(e^{-\sigma_p^2} R_{ss}(\omega) + (1 - e^{-\sigma_p^2} + \sigma_m^2) \text{diag}(R_{ss}(\omega)) \right)$$

35. A diffracting structure as in claim 1, wherein signals from said microphones are processed using the following method:

(aa) determining an expression for an expected gain of said array, said expression being dependent on weights assigned to each signal from a microphone in the array, and

(ab) maximizing said expression,

41
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wherein said expression also contains variables representing a variance of magnitude fluctuations from inputs from said microphone and a variance of phase fluctuations from said inputs from said microphone.

36. A diffracting structure as in claim 35 wherein said expression is

$$E\{G(\omega)\} = \frac{e^{-\sigma_p^2} (W_0^H R_{ss}(\omega) W_0) + (1 - e^{-\sigma_p^2} + \sigma_m^2) (W_0^H \text{diag}(R_{ss}(\omega)) W_0)}{e^{-\sigma_p^2} (W_0^H R_{nn}(\omega) W_0) + (1 - e^{-\sigma_p^2} + \sigma_m^2) (W_0^H \text{diag}(R_{nn}(\omega)) W_0)}$$

where

$E\{G(\omega)\}$ is the expected gain,

σ_m^2 is the variance of the magnitude fluctuations due to microphone tolerance,

σ_p^2 is the variance of the phase fluctuations due to microphone tolerance,

R_{ss} is a signal correlation matrix,

R_{nn} is a noise correlation matrix,

W_0 is a nominal value vector of weights assigned to each microphone in the array.

37. A diffracting structure as in claim 36 wherein step (ab) is accomplished by setting the vector W_0 .

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equal to the eigenvector which corresponds to the maximum eigenvalue of the symmetric matrix

$$A^{-1}B$$

where

$$A = \left(e^{-\sigma_p^2} R_{nn}(\omega) + (1 - e^{-\sigma_p^2}) \text{diag}(R_{nn}(\omega)) \right)$$

and

$$B = \left(e^{-\sigma_p^2} R_{ss}(\omega) + (1 - e^{-\sigma_p^2} + \sigma_m^2) \text{diag}(R_{ss}(\omega)) \right)$$

38. A diffracting structure as in claim 29, wherein signals from said microphones are processed using the following method:

(aa) determining an expression for an expected gain of said array, said expression being dependent on weights assigned to each signal from a microphone in the array, and

(ab) maximizing said expression,

wherein said expression also contains variables representing a variance of magnitude fluctuations from inputs from said microphone and a variance of phase fluctuations from said inputs from said microphone.

39. A diffracting structure as in claim 38 wherein said expression is

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$$E\{G(\omega)\} = \frac{e^{-\sigma_p^2} (W_0^H R_{ss}(\omega) W_0) + (1 - e^{-\sigma_p^2} + \sigma_m^2) (W_0^H \text{diag}(R_{ss}(\omega)) W_0)}{e^{-\sigma_p^2} (W_0^H R_{nn}(\omega) W_0) + (1 - e^{-\sigma_p^2} + \sigma_m^2) (W_0^H \text{diag}(R_{nn}(\omega)) W_0)}$$

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where

$E\{G(\omega)\}$ is the expected gain,

σ_m^2 is the variance of the magnitude fluctuations due to microphone tolerance,

σ_p^2 is the variance of the phase fluctuations due to microphone tolerance,

R_{ss} is a signal correlation matrix,

R_{nn} is a noise correlation matrix,

W_0 is a nominal value vector of weights assigned to each microphone in the array.

40. A diffracting structure as in claim 39 wherein step (ab) is accomplished by setting the vector W_0 equal to the eigenvector which corresponds to the maximum eigenvalue of the symmetric matrix

$$A^{-1}B$$

where

$$A = \left(e^{-\sigma_p^2} R_{nn}(\omega) + (1 - e^{-\sigma_p^2}) \text{diag}(R_{nn}(\omega)) \right)$$

and

$$B = \left(e^{-\sigma_p^2} R_{ss}(\omega) + (1 - e^{-\sigma_p^2} + \sigma_m^2) \text{diag}(R_{ss}(\omega)) \right)$$